CHAPTER 4

EMPLOYMENT IMPACTS

INTRODUCTION

The employment impacts of quantified control measures and clean air benefits were analyzed by utilizing the Regional Economic Model, Inc. (REMI) model. This model contains 19 sub-regions within the four-county area. Each sub-region is comprised of 70 public and private sectors. The structure of each sub-region's economy is represented through production, sales, and purchases between sectors; demand and supply of products in each sector; expenditures made by consumers, businesses, and governments; and product flows between one sub-region, the rest of the sub-regions, and the rest of the U.S.

The employment impact analysis was performed separately for quantified control measures and clean air benefits since quantified control measures represent only 47 percent of the total emission reductions required for meeting the air quality standards and quantification of benefits includes all the intended emission reductions. As such, these impacts should not be summed. The employment impacts in this chapter represent changes from the baseline regional jobs.

Alternatively, an employment impact analysis could be performed for the quantified measures (representing 47 percent of the total emission reductions only) and their corresponding air quality benefits. However, these measures are not expected to bring the Basin into the attainment of the air quality standards. The resulting employment analysis would thus not be meaningful.

JOB IMPACTS FROM QUANTIFIED MEASURES AND BENEFITS

Implementation of the Draft Final 2007 AQMP will reduce morbidity and mortality; improve visibility; decrease expenditures on household cleaning, refurbishing building surfaces, and tire replacement; provide relief to congestion; and increase crop yields, as discussed in Chapter 3. The total quantifiable benefit of the Draft Final 2007 AQMP amounts to approximately $13.2 billion in 2014 and $23.3 billion in 2023. The quantified measures, which represent 47 percent of the emission reductions intended for attainment, will result in an annual cost of approximately $1.7 billion in 2014 and $2.1 billion in 2023. Both benefits and costs will affect the employment base in the four-county economy.

The four-county economy will expand from the effects of two major forces resulting from cleaner air. First, the substitution of imports [general consumer purchases (which would increase due to the reduction in health care expenditures)] for local production (reduced health care services related to improved air quality) leads to jobs not created.[1] Second, the improvement in the quality of life will make the area more attractive so that more people will move in until the expected real earnings rate is reduced sufficiently to compensate for the estimated effect of the increased amenities.[2] This influx will increase the labor force and local

[1] General consumer purchases can be satisfied by local production and imports. Health care services are locally produced goods.

[2] Because of cleaner air, economic migrants are willing to move into the Basin in exchange for lower earnings (wage and salary) than what the Basin would otherwise be. Currently, there is no systematic approach to evaluating migration of retired persons as they do not belong to the labor force. Therefore, their willingness to pay (and non-wage generated

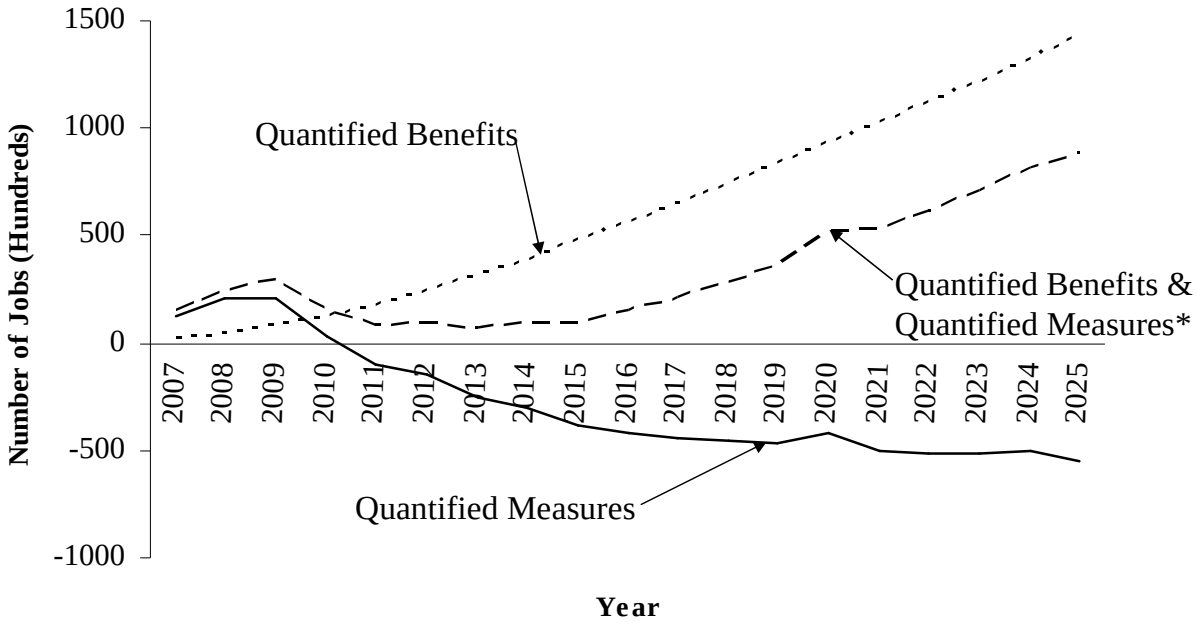
demand. On the other hand, the local economy will also experience relative slowdown from implementing control measures. This is because the increased cost of doing business leads to fewer jobs created and the resulting higher product price would lower consumer purchasing power. Table 4-1 shows the average annual job impacts, as well as job impacts with respect to the years 2014 and 2023, for quantified benefits and control measures, respectively. Figure 4-1 shows the trends of job impacts from quantified benefits and quantified measures from 2007 to 2025, respectively.

TABLE 4-1
Job Impacts of Quantified Clean Air Benefits and Measures

Category	2014	2023	Average Annual
Quantified Benefits	39,179	121,971	61,409
Congestion Relief	5,600	14,620	7,783
Visibility Improvements	15,790	50,900	25,361
Reduced Materials Expenditures	1,465	4,326	2,219
Health Benefits	15,624	50,327	25,060
Increased Crop Yields	587	679	574
Quantified Control Measures	-29,735	-51,693	-28,279

Results from modeling all the categories are slightly different from the sum of results from modeling each category one at a time because of nonlinearity of the REMI model.

FIGURE 4-1
Job Impacts of Quantified Clean Air Benefits and Measures



*For illustration purposes, as the quantified cost analysis did not include long-term measures.

income stream) for avoided morbidity and mortality is not accounted for in the migration functions that were used only for economic migrants in the labor force.

The job impact of air quality benefits is assessed separately for each benefit category: visibility improvements, increased crop yields, health benefits, reduced congestion, and reduced expenditures on materials. Many of the benefits of improved air quality can be seen as both direct and indirect benefits to individuals living in the area. For example, reductions in out-of-pocket health expenditures are used as a proxy for the quality-of-life value of morbidity benefits (i.e., reduced illness). The overwhelming positive amenities from cleaner air would induce more in-migration. Additional health care expenditures from economic migrants would more than compensate for the reduction in these expenditures due to avoided morbidity. A net gain of approximately 25,060 more jobs annually from health benefits is projected. Moreover, decreased congestion could create an additional 7,783 jobs. Together, the quantified benefits could result in an average of 61,409 jobs created annually.

The total projected employment without the Draft Final AQMP in 2025 is 11.1 million jobs. There would be over 1.7 million net jobs created between 2007 and 2025 with an annual rate of growth at 0.93 percent. The quantifiable control measures will result in an average of 28,279 jobs forgone annually, on average, over the period from 2007 to 2025. The 130 transportation projects alone are projected to result in 1,239 jobs created from constructing and maintaining highway and transit (bus and rail) infrastructure. These projects will be funded through local revenue sources and out-of-area funding sources (state and federal governments). However, it should be noted that operation and maintenance of these infrastructure projects will continue to be required long after these projects are completed. The remaining control measures are projected to result in jobs forgone.

Job Impacts by Industry

Tables 4-2 and 4-3 show the average annual job impact by industry between 2007 and 2025 and with respect to the years 2014 and 2023 for quantified clean air benefits and measures, respectively. In total, cleaner air would result in a creation of 61,409 jobs annually, on average, from 2007 to 2025 which is approximately 0.58 percent of the baseline jobs (employment projections without the implementation of the 2007 AQMP) during the same period. The sectors that are projected to have the relatively large share of jobs created are government, construction, and education, health, and social services. As the area becomes more attractive due to cleaner air, more people will move in and thus demand more services from governments. The jobs forgone in the truck transportation sector are due to the reduced demand for this sector resulting from the implementation of SCAG TCMs.

TABLE 4-2

Draft Final 2007 AQMP Employment Impacts by Industry for Quantified Clean Air Benefits

Industry	NAICS	2014		2023		Average Annual (2007-2025)	
		Jobs	% Baseline	Jobs	% Baseline	Jobs	% Baseline
Agriculture, Forestry, Fishing & Hunting	11	283	0.59	298	0.73	272	0.59
Mining	21	19	0.24	59	0.82	30	0.38
Utilities	22	97	0.42	286	1.19	147	0.63
Construction	23	3859	0.67	11,899	1.81	6027	1.02
Transportation Equipment Mfg.	336	101	0.14	469	0.68	213	0.30
Petroleum & Coal Products Mfg.	324	13	0.28	34	0.87	18	0.40
Other Manufacturing	31-33 ex. 324 & 336	2745	0.43	8346	1.29	4238	0.64
Wholesale Trade	42	1046	0.26	2892	0.80	1518	0.39
Retail Trade	44-45	3252	0.31	9921	0.98	5042	0.49
Rail Transportation	482	13	0.25	37	0.83	19	0.38
Water Transportation	483	2	0.16	7	0.48	3	0.24
Truck Transportation	484, 492	-1201	-0.73	-601	-0.34	-903	-0.54
Other Transportation & Warehousing	48-49 ex. 482-484 & 492	284	0.17	1062	0.56	503	0.29
Information	51	478	0.14	1550	0.47	770	0.24
Finance and Insurance	52	1475	0.31	4501	0.93	2283	0.48
Real Estate and Rental and Leasing	53	2158	0.46	6075	1.24	3170	0.67
Professional and Technical Services	54	2249	0.27	7434	0.80	3672	0.43
Management & Support Services	55-56	2985	0.30	9889	0.87	4882	0.47
Education, Health and Social Services	61-62	4831	0.34	17,677	0.97	8460	0.57
Arts, Entertainment, and Recreation	71	501	0.15	1639	0.46	813	0.25
Accommodation and Food Services	72	2091	0.29	5367	0.73	2900	0.40
Other Services	81	1571	0.25	4293	0.69	2266	0.36
Government	92	10,329	0.87	28,837	2.37	15,064	1.28
Total		**39,179**	**0.37**	**121,971**	**1.08**	**61,409**	**0.58**

Implementation of quantified measures would, on the other hand, result in jobs foregone. At the sectoral level, manufacturers of transportation equipment and the wholesale trade sector are projected to experience additional jobs created. A number of on- and off-road mobile source measures would stimulate additional demand for transportation equipment and devices produced by these sectors. The heavy infrastructure investment resulting from the 130 transportation projects would certainly benefit the construction industry. On the other hand, this same sector is regulated by a number of off-road mobile source measures. While investments in roadway technology and other infrastructure made by the government sector benefit a number of other sectors, the government sector itself is projected to experience jobs forgone due to the reduced spending elsewhere in order to compensate for the increase in these investments. The retail trade and services sectors are projected to have relatively large share of jobs forgone mainly due to the reduction in personal income resulting from the overall jobs forgone in the economy.

TABLE 4-3
Draft Final 2007 AQMP Employment Impacts by Industry for Quantified Measures

Industry	NAICS	2014		2023		Average Annual (2007-2025)	
		Jobs	% Baseline	Jobs	% Baseline	Jobs	% Baseline
Agriculture, Forestry, Fishing & Hunting	11	5	0.01	-5	-0.01	0	0.00
Mining	21	-25	-0.32	-36	-0.51	-27	-0.34
Utilities	22	-70	-0.31	-91	-0.38	-66	-0.28
Construction	23	-2738	-0.48	-4353	-0.66	-212	-0.04
Transportation Equipment Mfg.	336	845	1.21	238	0.34	321	0.45
Petroleum & Coal Products Mfg.	324	-24	-0.52	-24	-0.63	-23	-0.51
Other Manufacturing	31-33 ex. 324 & 336	-232	-0.04	-1876	-0.29	-147	-0.02
Wholesale Trade	42	487	0.12	-1095	-0.30	-531	-0.14
Retail Trade	44-45	-2953	-0.28	-4547	-0.45	-3174	-0.31
Rail Transportation	482	-23	-0.43	-35	-0.80	-23	-0.44
Water Transportation	483	-20	-1.34	-78	-5.67	-36	-2.49
Truck Transportation	484, 492	-247	-0.15	-645	-0.37	-315	-0.19
Other Transportation & Warehousing	48-49 ex. 482-484 & 492	-327	-0.19	-617	-0.32	-395	-0.23
Information	51	-394	-0.12	-687	-0.21	-420	-0.13
Finance and Insurance	52	-1300	-0.27	-2049	-0.42	-1338	-0.28
Real Estate and Rental and Leasing	53	-1124	-0.24	-2121	-0.43	-1255	-0.27
Professional and Technical Services	54	-1499	-0.18	-3191	-0.34	-1503	-0.18
Management & Support Services	55-56	-1784	-0.18	-3994	-0.35	-2160	-0.21
Education, Health and Social Services	61-62	-1173	-0.08	-3625	-0.20	-1755	-0.12
Arts, Entertainment, and Recreation	71	-487	-0.15	-806	-0.23	-510	-0.15
Accommodation and Food Services	72	-2001	-0.27	-3141	-0.43	-2041	-0.28
Other Services	81	-396	-0.06	-3113	-0.50	-1225	-0.20
Government	92	-14,253	-1.21	-15,800	-1.30	-11,441	-0.97
Total		**-29,735**	**-0.28**	**-51,693**	**-0.46**	**-28,279**	**-0.26**

Small Business Effects

The District defines a "small business" in Rule 102 as one which employs 10 or fewer persons and which earns less than $500,000 in gross annual receipts. In addition to the District's definition of a small business, the federal Small Business Administration (SBA), the federal Clean Air Act Amendments of 1990 (CAAA), and the California Department of Health Services (DHS) also provide their own definitions of a small business. Two common characteristics of the SBA, CAAA, and DHS small business definitions are the following: (1) standards are unique to each industry type, and (2) the businesses have to be independently owned and operated, and cannot be dominant in their field.

The SBA's definition of a small business uses the criterion of either gross annual receipts (ranging from $0.5 million to $17 million, depending on industry type) or number of employees (ranging from 100 to 1,500). The CAAA classifies a facility as a "small business stationary

source" if it (1) employs 100 or fewer employees, (2) does not emit more than 10 tons per year of either ROG or NO_X, and (3) is a small business as defined by SBA. The DHS definition of a small business uses an annual gross receipt criterion (ranging from $1 million to $9.5 million, depending on industry type) for non-manufacturing industries and an employment criterion of fewer than 250 employees for manufacturing industries.

Under the SBA's and CAAA's definitions of small business, the AQMP could potentially impact a wide range of small businesses. The number of affected small businesses will be fewer under the District's definition. Small businesses are more highly concentrated in non-manufacturing than manufacturing sectors. A few control measures such as CTS-01 on lubricants and CMB-01 on non-RECLAIM ovens, dryers, and furnaces may affect small businesses. Since the affected businesses are not exactly known at this stage, additional analyses of the number and types of small businesses affected by control measure and the ensuing job impacts will be performed during individual rule development processes.

SUMMARY

Without the 2007 AQMP, jobs in the four-county area are projected to grow at an annual rate of about 0.93 percent between 2007 and 2025, which would be approximately 95,000 jobs per year. Cleaner air from the 2007 AQMP would result in an additional 61,409 jobs created per year. This would increase the job growth rate by 0.07 percent and bring it to an annual rate of 1.004 percent from 2007 to 2025. On the other hand, the quantified measures would result in 28,279 jobs forgone, thereby slowing down the job growth rate by 0.04 percent, to 0.898 percent. The four-county region is projected to have 11.1 million jobs in 2025. The jobs created from quantified clean air benefits would amount to 0.58 percent of the baseline jobs, on average. The jobs forgone from quantified measures would be 0.26 percent of the baseline jobs, on average. This analysis is based on quantified measures and quantified benefits only.

Nearly all the industries would experience additional jobs created due to cleaner air. The wholesale trade sector and manufacturers of transportation equipment would experience additional jobs created due to additional demand for their products as required by on- and off-road control measures.

The potential small business impacts of individual control measures will be further examined in the rule development process. The employment impacts associated with unquantified measures will be examined further as the affected industries of these measures are defined in more detail. In addition, as measures are developed into rules, their potential employment impacts will be specifically assessed.